T-Mobile's Google Maps Overview of the Product

1

http://www.t-mobile.com/promotions/genericregular.aspx?&PAsset=Pro_Pro_G1

EXHIBIT 2

U.S. Patent No. 7,289,763 Claims 23, 26, 28, 31 and 32

23. A method of providing a location-based service comprising the steps of:

obtaining a unique mobile identification number from a mobile unit via a cellular communication system comprising a plurality of networked antennas, the mobile unit being in radio contact with at least one of the networked antennas;

receiving a request for a location-based service from the mobile unit;

acquiring positional data corresponding to an exact geographic location for the mobile unit via the cellular communication system;

comparing the positional data with stored geographic data for the location-based service; and

responding to the request for a location-based service based on the comparison.

26. The method of claim **23**, wherein the step of responding to the request comprises furnishing the positional data.

28. The method of claim **23**, wherein the positional data is acquired using a global positioning system.

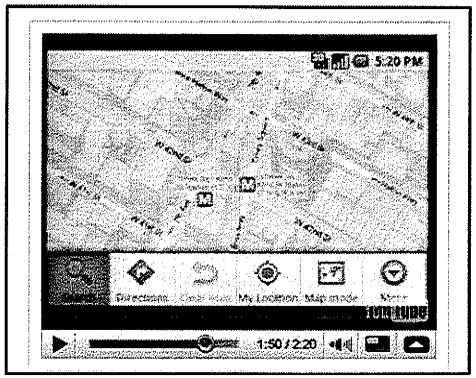
31. The method of claim **23**, wherein the positional data is acquired using a system selected from the group consisting of a global positioning system and triangulation.

32. The method of claim **23**, further comprising the step of furnishing the positional data for use in the location-based service.

23. A method of providing a location-based service comprising the steps of:

T-Mobile's Google Maps provides location-based services to its subscribers.

Source: http://www.t-mobile.com/promotions/genericregular.aspx?&PAsset=Pro_Pro_G1



- Determine your current location and find businesses and landmarks
- Get driving directions and real time traffic
- Use satellite imagery and Street View to explore new places

Find out more about Android.

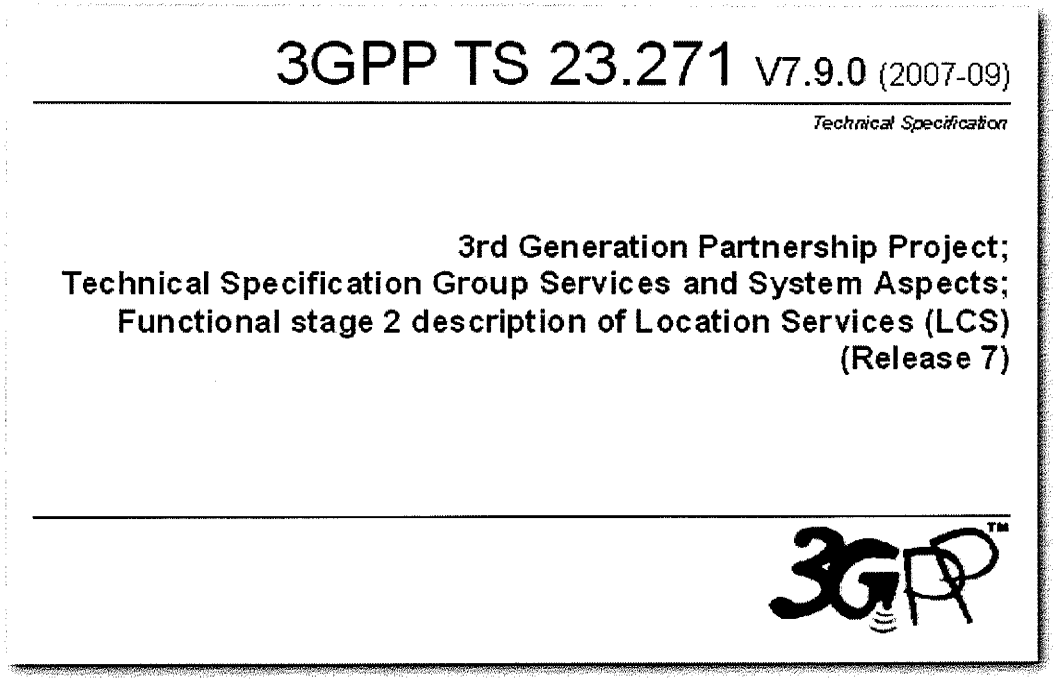
Source: http://www.google.com/mobile/android/maps/index.html

U.S. Patent No. 7,289,763 Claim 23 , 26, 28, 31 and 32 – Infringed by T-Mobile's Google Maps

obtaining a unique mobile identification number from a mobile unit

(Slide 1/4)

On information and belief, Defendant is using 3GPP TS 23.271 UTRAN standard. This infringement chart is based on the 23.271 standard. If the 23.271 standard is not being used, Plaintiffs can still read this claim against the relevant portions of any of the location based services standards. If Plaintiffs learn through discovery that a different location-based services standard is being used, Plaintiffs will supplement this infringement chart accordingly.



3GPP TS 23.271 V7.9.0 (2007-09)

Technical Specification

3rd Generation Partnership Project;
Technical Specification Group Services and System Aspects;
Functional stage 2 description of Location Services (LCS)
(Release 7)

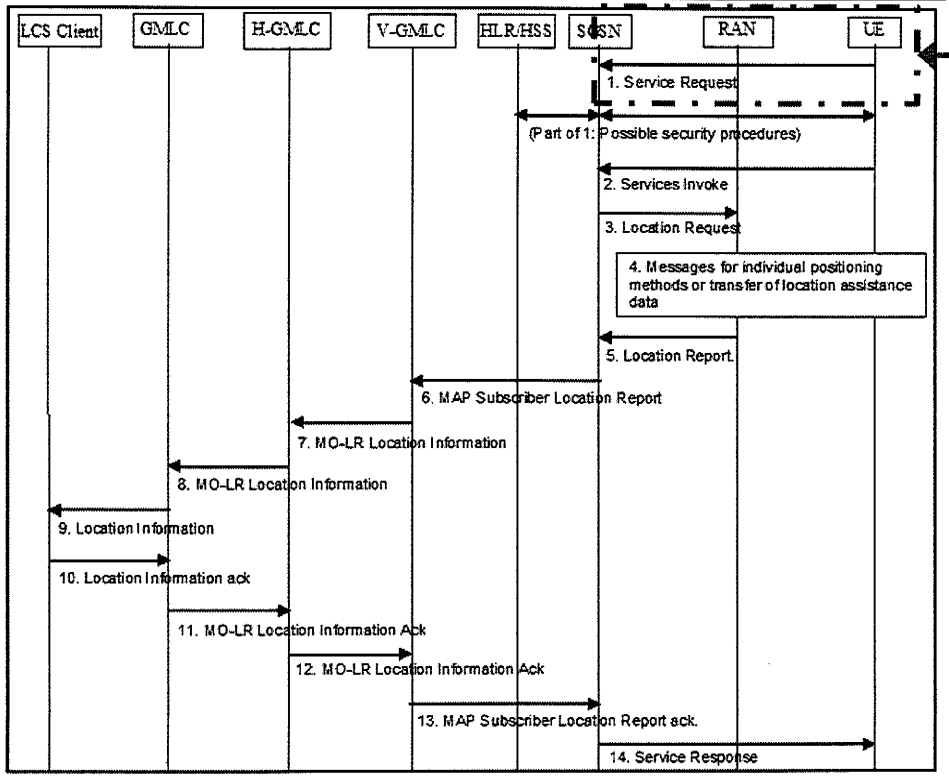
obtaining *a unique mobile identification number from a mobile unit*

(Slide 2/4)

On information and belief, the Mobile Originating Location Request, Packet Switched (PS-MO-LR) call flow is used to implement the aforementioned location-based service. The PS-MO-LR call flow is shown below. The unique mobile identification number is obtained from the mobile unit through the "Service Request" message sent from the mobile unit. As will be shown in later slides, the "Service Request" message includes the unique mobile identification number.

9.2.2 Mobile Originating Location Request, Packet Switched (PS-MO-LR)

The following procedure shown in figure 9.8 allows an UE to request either its own location and optionally, velocity; location assistance data or broadcast assistance data message ciphering keys from the network. Location assistance data may be used subsequently by the UE to compute its own location throughout an extended interval using a mobile based position method. A ciphering key enables the UE to decipher other location assistance data broadcast periodically by the network. The PS-MO-LR may be used to request ciphering keys or GNSS assistance data. The procedure may also be used to enable an UE to request that its own location be sent to an external LCS client.



Source: 3GPP TS 23.271 V7.9.0 (2007-09), Pg. 100

U.S. Patent No. 7,289,763 Claim 23 , 26, 28, 31 and 32 – Infringed by T-Mobile's Google Maps

obtaining *a unique mobile identification number from a mobile unit*

(Slide 3/4)

The normative reference 3GPP TS 24.008 describes the contents of the Service Request message which includes Mobile Station Identity (described in Section 10.5.1.4 of 3GPP TS 24.008). The Mobile Identity provides the International Mobile Subscriber Identity (IMSI), the Temporary Mobile Subscriber Identity (TMSI/P-TMSI), the International Mobile Equipment Identity (IMEI), or the International Mobile Equipment Identity with software version (IMEISV).

2.1 Normative references

[24] 3GPP TS 24.008: "Mobile Radio Interface - Layer 3 MM/CC Specification".

Source: 3GPP TS 23.271 V7.9.0 (2007-09), Pgs. 9-10

9.4.20 Service Request (UMTS only)

Table 9.4.20/3GPP TS 24.008: Contents of Service Request message content

IEI	Information Element	Type/Reference	Presence	Format	Length
	Protocol discriminator	Protocol discriminator 10.2	M	V	1/2
	Skip indicator	Skip indicator 10.3.1	M	V	1/2
	Service Request	Message type 10.4	M	V	1
	Ciphering key sequence number	Ciphering key sequence number 10.5.1.2	M	V	1/2
	Service type	Service type 10.5.5.20	M	V	1/2
	P-TMSI	Mobile station identity 10.5.1.4	M	LV	6
32	PDP context status	PDP context status 10.5.7.1	O	TLV	4
35	MBMS context status	MBMS context status 10.5.7.6	O	TLV	2 - 18
36	Uplink data status	Uplink data status 10.5.7.7	O	TLV	4

10.5.1.4 Mobile Identity

The purpose of the *Mobile Identity* information element is to provide either the international mobile subscriber identity, IMSI, the temporary mobile subscriber identity, TMSI/P-TMSI, the international mobile equipment identity, IMEI, the international mobile equipment identity together with the software version number, IMEISV, or the temporary mobile group identity (TMGI), associated with the optional MBMS Session Identity.

The IMSI shall not exceed 15 digits, the TMSI/P-TMSI is 4 octets long, and the IMEI is composed of 15 digits, the IMEISV is 16 digits (see 3GPP TS 23.003 [10]). The TMGI is at maximum 6 octets long and is defined in subclause 10.5.6.13. The MBMS Session Identity, if included, is 1 octet long (see 3GPP TS 48.018 [86]).

Source: 3GPP TS 24.008 V8.0.0, Pgs. 310 and 336

U.S. Patent No. 7,289,763 Claim 23 , 26, 28, 31 and 32 – Infringed by T-Mobile's Google Maps

obtaining *a unique mobile identification number from a mobile unit*

(Slide 4/4)

As indicated on the previous slide, IMSI, TMSI and the IMEI/IMEISV are described in 3GPP TS 23.003. The 3GPP TS 23.003 standard and the ITU-T Recommendation E.212 normative reference specify, respectively, that the IMEI/IMEISV and IMSI/TMSI are unique mobile identification numbers.

6 International Mobile Station Equipment Identity and Software Version Number

6.1 General

The structure and allocation principles of the International Mobile station Equipment Identity and Software Version number (IMEISV) and the International Mobile station Equipment Identity (IMEI) are defined below.

The Mobile Station Equipment is uniquely defined by the IMEI or the IMEISV.

Source: 3GPP TS 23.003 V8.0.0 (2008-03), Pg. 19

1.1.1 Normative references

[11] ITU-T Recommendation E.212: "The international identification plan for mobile terminals and mobile users".

Source: 3GPP TS 23.003 V8.0.0 (2008-03), Pgs. 7-8

2 Identification of mobile subscribers

2.1 General

A unique International Mobile Subscriber Identity (IMSI) shall be allocated to each mobile subscriber in the GSM/UMTS/EPS system.

NOTE: This IMSI is the concept referred to by ITU-T as "International Mobile Station Identity".

In order to support the subscriber identity confidentiality service the VLRs, SGSNs and MME may allocate Temporary Mobile Subscriber Identities (TMSI) to visiting mobile subscribers. The VLR,SGSN and MME must be capable of correlating an allocated TMSI with the IMSI of the MS to which it is allocated.

Source: 3GPP TS 23.003 V8.0.0 (2008-03), Pgs. 10-11

3.2 **International Mobile Subscriber Identity (IMSI)**: The IMSI is a string of decimal digits, up to a maximum of 15 digits, that identifies a unique mobile terminal or mobile subscriber internationally. IMSIs may also be used for terminal or subscriber identification within fixed or wireline networks that offer mobility services, or to achieve compatibility with networks that have mobility services. The IMSI consists of three fields: the MCC, the MNC, and the MSIN.

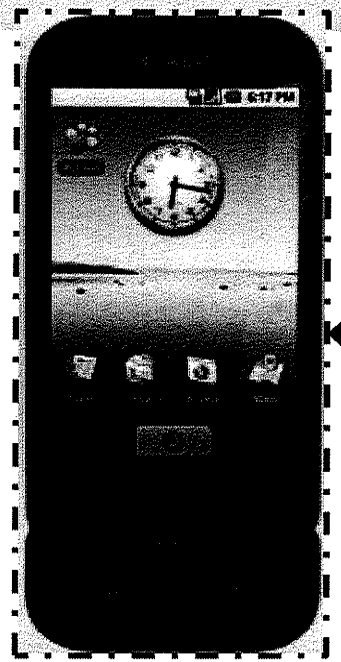
Source: ITU-T Rec. E.212 v.05/2004, Pg 2

U.S. Patent No. 7,289,763 Claim 23 , 26, 28, 31 and 32 – Infringed by T-Mobile's Google Maps

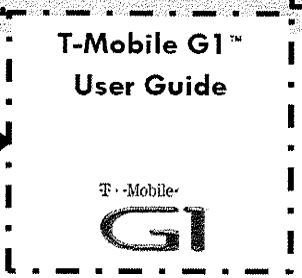
via a cellular communication system

(Slide 1/3)

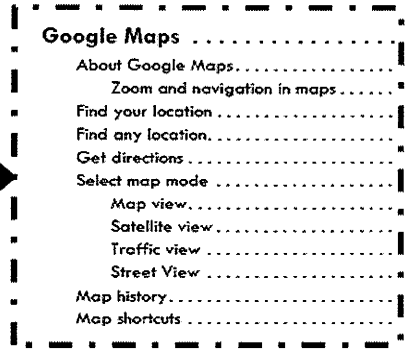
T-Mobile's Google Maps on a T-Mobile phone (G1) uses the T-Mobile network to obtain a unique mobile identification number from a mobile unit, using the UMTS protocol.



Source: T-Mobile G1 website



Source: T-Mobile G1 User Guide, Cover Page, Page 1



Source: T-Mobile G1 User Guide, Table of Contents, Page 5

T-Mobile USA Begins Commercial 3G Network Rollout

Company Launches UMTS/HSDPA Network in New York City on its AWS Spectrum; Plans 3G Network Launches in Major Markets Across the Country in the Coming Months

NEW YORK and BELLEVUE, Wash. – May 5, 2008
T-Mobile USA, Inc. today announced that the company has taken the first commercial step in the rollout of its third-generation (3G) wireless network by launching its UMTS/HSDPA network in New York City. T-Mobile plans to continue the rollout of its 3G network across major metropolitan markets through the year. By year's end, T-Mobile expects its high-speed data network will be available in those cities where a majority of its subscribers currently use data services.

Source: http://www.t-mobile.com/company/PressReleases_Article.aspx?assetName=Prs_Prs_20080505&title=T-Mobile%20USA%20Begins%20Commercial%203G%20Network%20Rollout

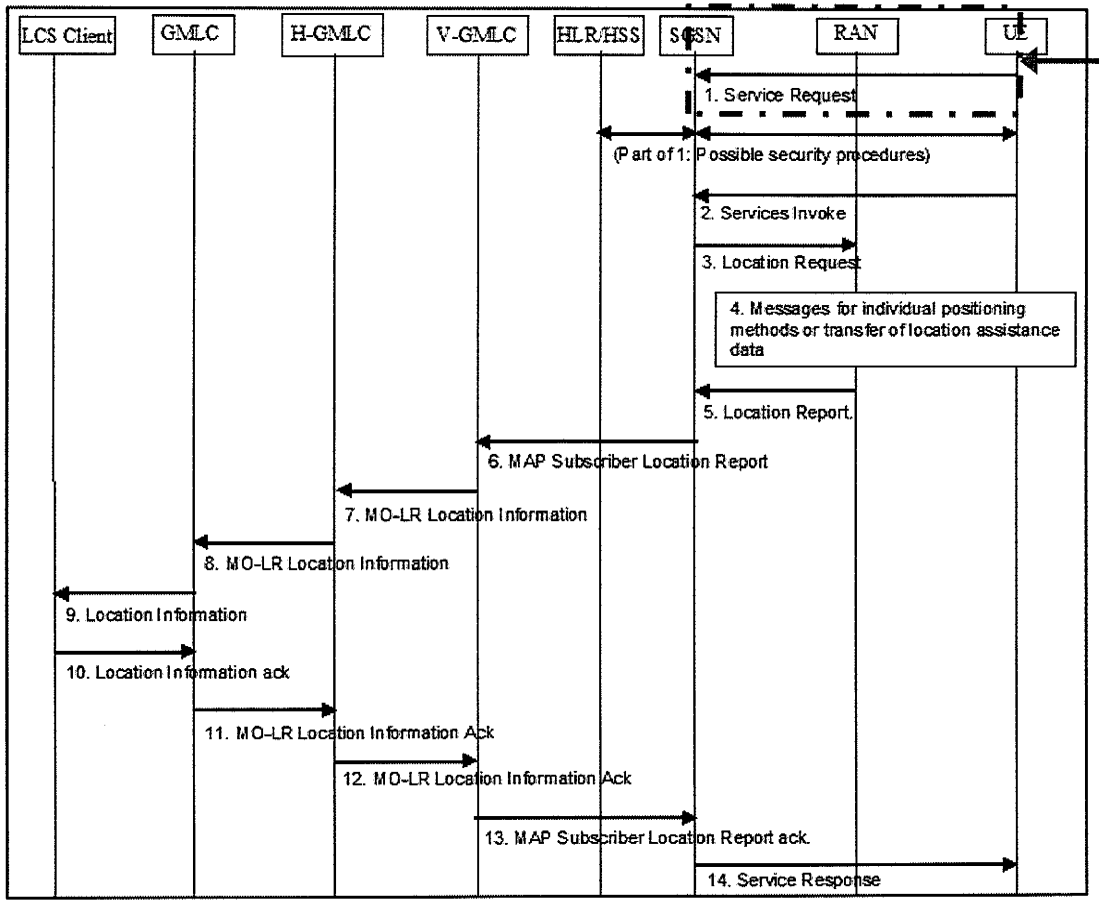
U.S. Patent No. 7,289,763 Claim 23 , 26, 28, 31 and 32 –
Infringed by T-Mobile's Google Maps

via a cellular communication system

(Slide 2/3)

In order to get the unique mobile identification number from the mobile unit, the Service Request message (containing the IMSI) is sent from the mobile unit to the Serving GPRS Support Node (SGSN) through the Radio Access Network (RAN) (i.e., a cellular communication system).

9.2.2 Mobile Originating Location Request, Packet Switched (PS-MO-LR)



Source: 3GPP TS 23.271 V7.9.0 (2007-09), Pg. 100

U.S. Patent No. 7,289,763 Claim 23 , 26, 28, 31 and 32 – Infringed by T-Mobile's Google Maps

via a cellular communication system

(Slide 3/3)

In order to get the unique mobile identification number from the mobile unit, the Service Request message (containing the IMSI) is sent from the mobile unit to the Serving GPRS Support Node (SGSN) through the Radio Access Network (RAN) (i.e., a cellular communication system).

2.1 Normative references

[20] 3GPP TS 23.002: "Network architecture".

Source: 3GPP TS 23.271 V7.9.0 (2007-09), Pgs. 9-10

The basic configuration of UTRAN LCS is presented in figure 3. The SMLC funtionality is integrated in SRNC or, in case a Stand-Alone SMLC entity (SAS) is present, split between SRNC and SMLC.

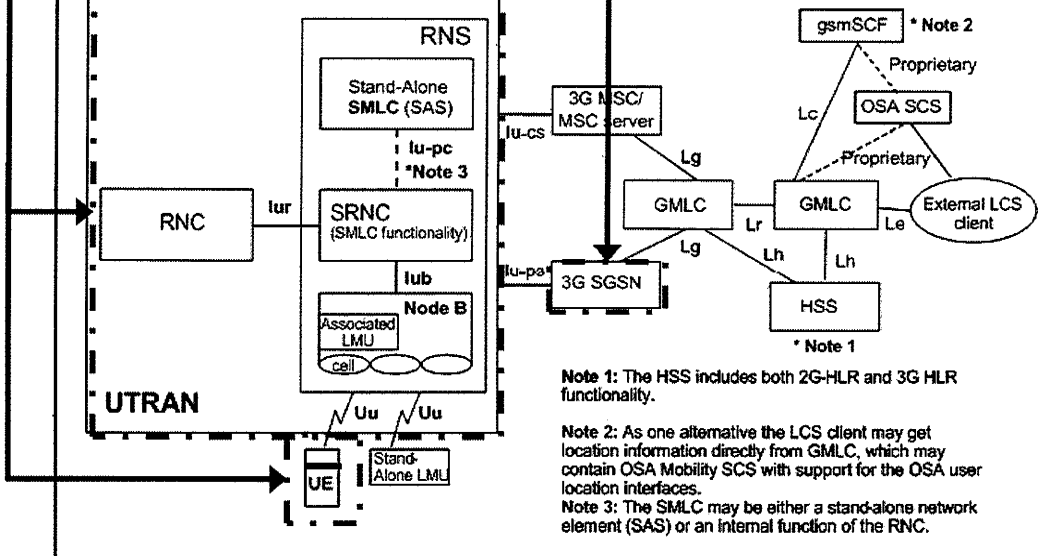


Figure 3: Configuration of LCS entities for a UTRAN PLMN

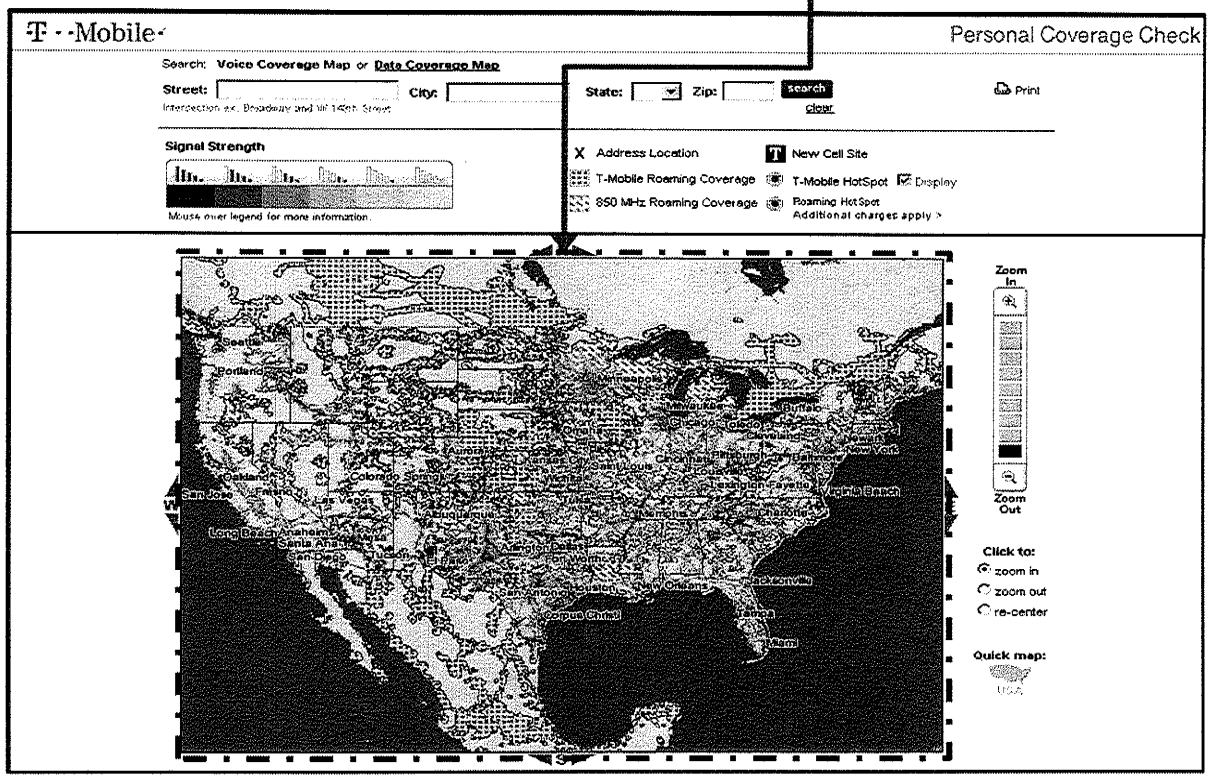
Source: 3GPP TS 23.002 V8.2.0 (2007-12), Pg. 35

U.S. Patent No. 7,289,763 Claim 23 , 26, 28, 31 and 32 – Infringed by T-Mobile's Google Maps

comprising a plurality of networked antennas, the mobile unit being in radio contact with at least one of the networked antennas;

(Slide 1/3)

Defendant's cellular communication system contains cell sites, which by definition have networked antennae, and are in radio contact with mobile units.



Source: http://compass.t-mobile.com/Default.aspx

U.S. Patent No. 7,289,763 Claim 23 , 26, 28, 31 and 32 – Infringed by T-Mobile's Google Maps

comprising a plurality of networked antennas, the mobile unit being in radio contact with at least one of the networked antennas;

(Slide 2/3)

The mobile unit communicates with the cellular communication network through a radio connection. The radio connection is established between the mobile unit and a radio access network (UMTS Terrestrial Radio Access Network (UTRAN)), which comprises cell sites, which in turn by definition, comprise a plurality of networked antennas. The normative reference 3GPP TS 23.002 describes UTRAN.

6 LCS Architecture

Figure 6.1 shows the general arrangement of the Location Service feature in GSM and UMTS. This illustrates, generally, the relation of LCS Clients and servers in the core network with the GERAN and UTRAN Access Networks. The LCS entities within the Access Network communicate with the Core Network (CN) across the A, Gb and Iu interfaces. Communication among the Access Network LCS entities makes use of the messaging and signalling capabilities of the Access Network.

As part of their service or operation, the LCS Clients may request the location information of UE. There may be more than one LCS client. These may be associated with the GSM/UMTS networks or the Access Networks operated as part of a UE application or accessed by the UE through its access to an application (e.g. through the Internet).

The clients make their requests to a LCS Server. There may be more than one LCS Server. The client must be authenticated and the resources of the network must be co-ordinated including the UE and the calculation functions, to estimate the location and optionally, velocity of the UE and result returned to the client. As part of this process, information from other systems (other Access Networks) can be used. As part of the location information returned to the client, an estimate of the accuracy of the estimate and the time-of-day the measurement was made may be provided.

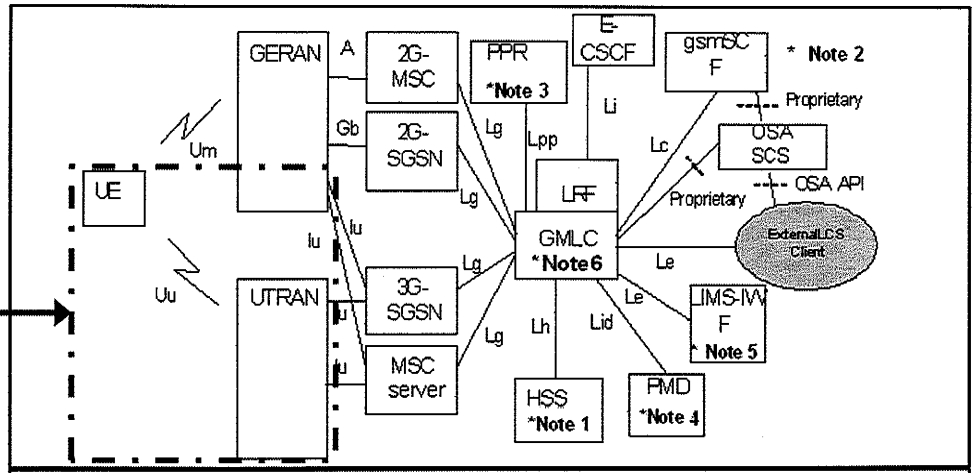


Figure 6.1-1: General arrangement of LCS

Source: 3GPP TS 23.271 V7.9.0 (2007-09), Pg. 30

U.S. Patent No. 7,289,763 Claim 23 , 26, 28, 31 and 32 – Infringed by T-Mobile's Google Maps

comprising a plurality of networked antennas,
the mobile unit being in radio contact with at least one of the networked antennas;

(Slide 3/3)

The mobile unit communicates with the cellular communication network through a radio connection. The radio connection is established between the mobile unit and a radio access network (UMTS Terrestrial Radio Access Network (UTRAN)), which comprises cell sites, which in turn by definition, comprise a plurality of networked antennas. The normative reference 3GPP TS 23.002 describes UTRAN.

2.1 Normative references

[20] 3GPP TS 23.002: "Network architecture".

Source: 3GPP TS 23.271 V7.9.0 (2007-09), Pgs. 9-10

5.2.2 Configuration of LCS entities for UTRAN

The basic configuration of UTRAN LCS is presented in figure 3. The SMLC funtionality is integrated in SRNC or, in case a Stand-Alone SMLC entity (SAS) is present, split between SRNC and SMLC.

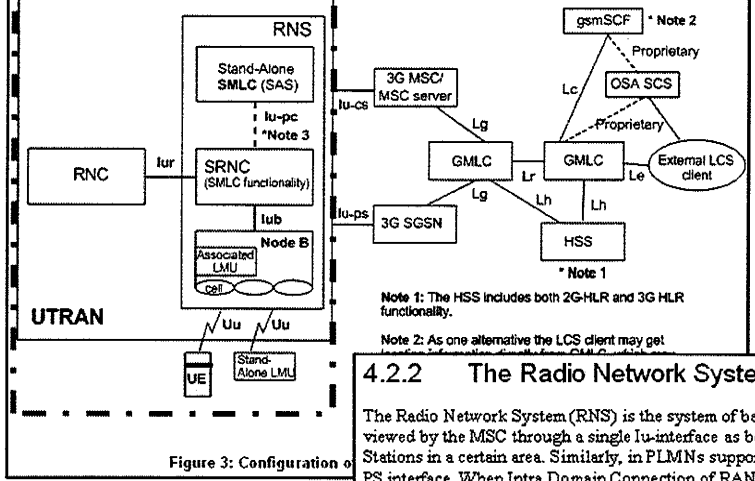


Figure 3: Configuration o

4.2.2 The Radio Network System (RNS)

The Radio Network System (RNS) is the system of base station equipments (transceivers, controllers, etc...) which is viewed by the MSC through a single Iu-interface as being the entity responsible for communicating with Mobile Stations in a certain area. Similarly, in PLMNs supporting GPRS, the RNS is viewed by the SGSN through a single Iu-PS interface. When Intra Domain Connection of RAN Nodes to Multiple CN Nodes is applied, an RNS may connect to several MSCs by several Iu-CS interfaces, and an RNS may connect to several SGSNs by several Iu-PS interfaces. The functionality for the Iu-CS interface is described in TS 25.410 [14a] and for the Iu-PS interface in TS 23.060 [9a]. The radio equipment of a RNS may support one or more cells. A RNS may consist of one or more base stations. The RNS consists of one Radio Network Controller (RNC) and one or more Node B.

The split of functions between RNS and CN is described in the 25-series of UMTS Technical Specifications.

4.2.2.1 Radio Network Controller (RNC)

A Radio Network Controller (RNC) is a network component in the PLMN with the functions for control of one or more Node B.

4.2.2.2 Node B

A Node B is a logical network component which serves one or more cells.

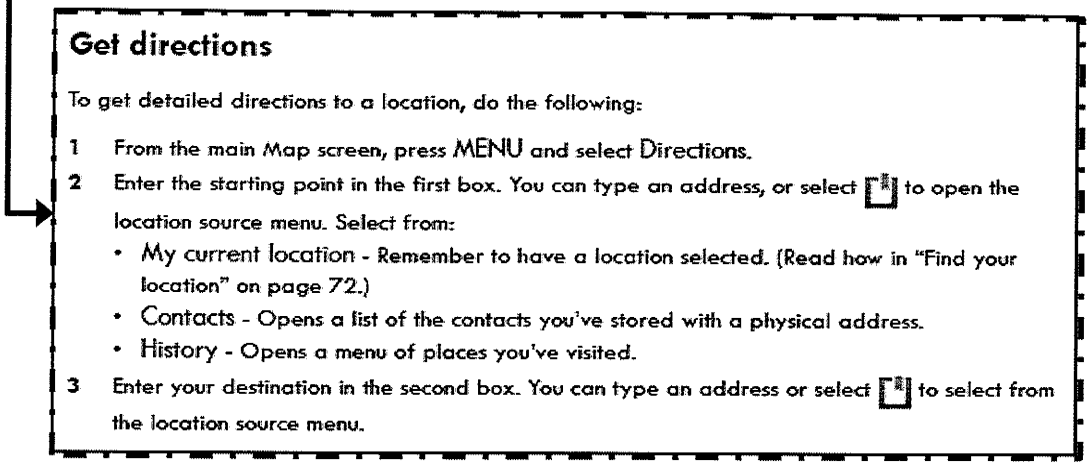
Source: 3GPP TS 23.002 V8.2.0, Pgs. 23 and 34

U.S. Patent No. 7,289,763 Claim 23 , 26, 28, 31 and 32 – Infringed by T-Mobile's Google Maps

receiving a request for a location-based service from the mobile unit;

(Slide 1/2)

Defendant receives a request for a location-based service from the mobile phone.



Get directions

To get detailed directions to a location, do the following:

1 From the main Map screen, press MENU and select Directions.

2 Enter the starting point in the first box. You can type an address, or select to open the location source menu. Select from:

- My current location - Remember to have a location selected. (Read how in "Find your location" on page 72.)
- Contacts - Opens a list of the contacts you've stored with a physical address.
- History - Opens a menu of places you've visited.

3 Enter your destination in the second box. You can type an address or select to select from the location source menu.

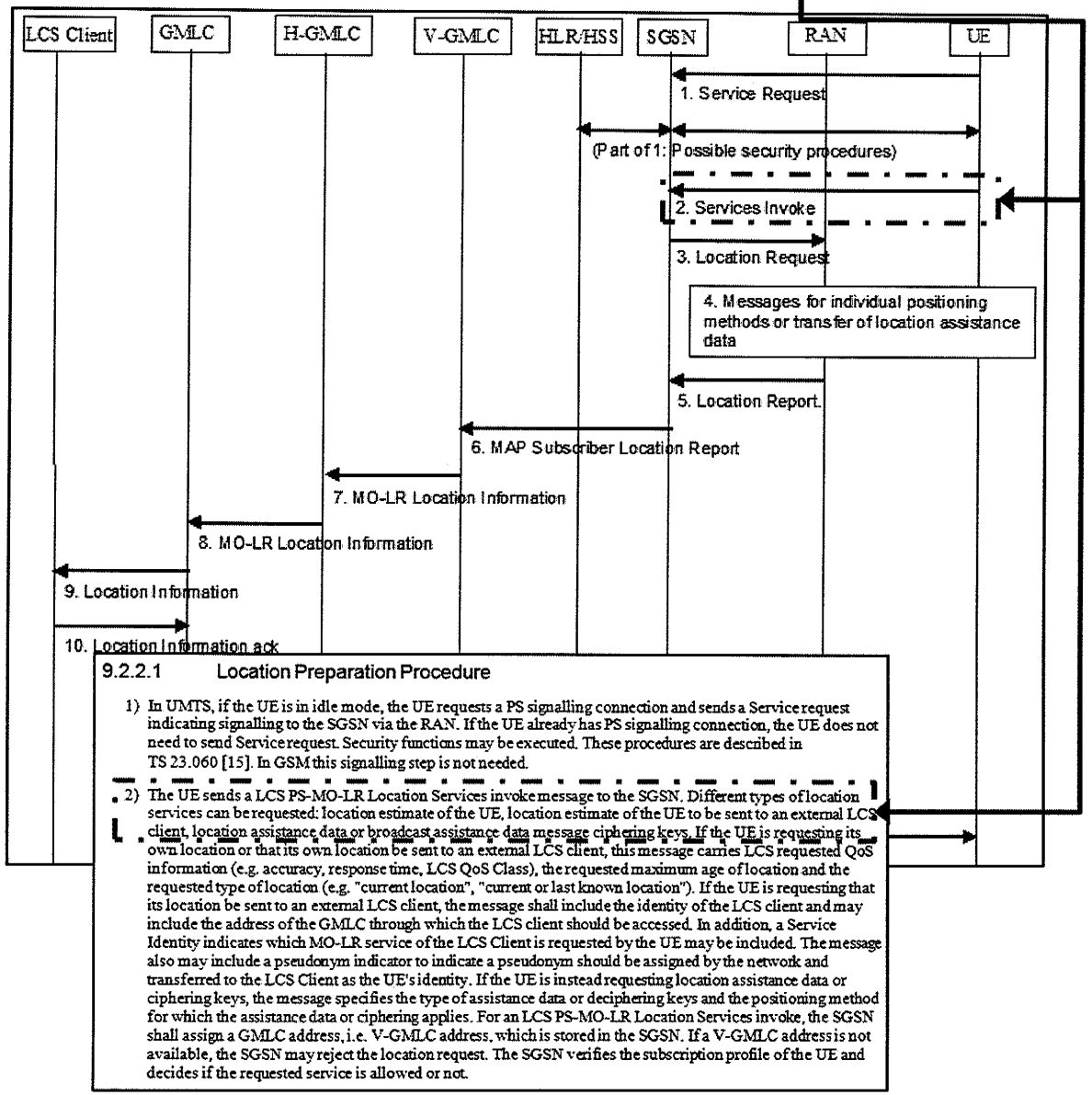
Source: T-Mobile G1 User Guide, Page 74

U.S. Patent No. 7,289,763 Claim 23 , 26, 28, 31 and 32 – Infringed by T-Mobile's Google Maps

receiving a request for a location-based service from the mobile unit;

(Slide 2/2)

The mobile unit sends a request for a location-based service to the network.



Source: 3GPP TS 23.271 V7.9.0 (2007-09), Pg. 100

U.S. Patent No. 7,289,763 Claim 23 , 26, 28, 31 and 32 – Infringed by T-Mobile's Google Maps

acquiring positional data corresponding to an exact geographic location for the mobile unit

(Slide 1/3)

T-Mobile's Google Maps must acquire positional data corresponding to the exact geographic location of the mobile phone, in order to eventually be able to deliver the location-based service, as shown below.

Features

My Location (beta). Google Maps on Android uses the built-in GPS to show your location on the map. And if GPS reading is temporarily unavailable, My Location shows your approximate location on the map. So you can always find where you are.

Watch a video to learn more about how My Location works.

Map and satellite views. Google Maps on Android gives you both map and satellite views of the area you're looking at, using an interface that feels just like it does on the desktop. Scroll in a direction to see more of the map, or zoom in and out by tapping the magnifying glass.

Street View. Want to see what would it look like if you were right there? Street View brings you street-level imagery of the location you're looking for, so you can explore an area thousands of miles away. With Compass Mode you can literally turn around and check for yourself.

Business listings. Search for businesses by name (e.g. "Joe's Pasta"), or by type (e.g. "Italian food") – then dial the business you're interested in with a single click. Thanks to My Location, it's easy to find nearby businesses without even having to enter your current location.

Driving directions. It's easy to get turn-by-turn driving directions. Thanks to the My Location feature, you don't even have to enter your starting point.

Traffic. Highways on Google Maps are colored green, yellow or red, based on real-time traffic data.

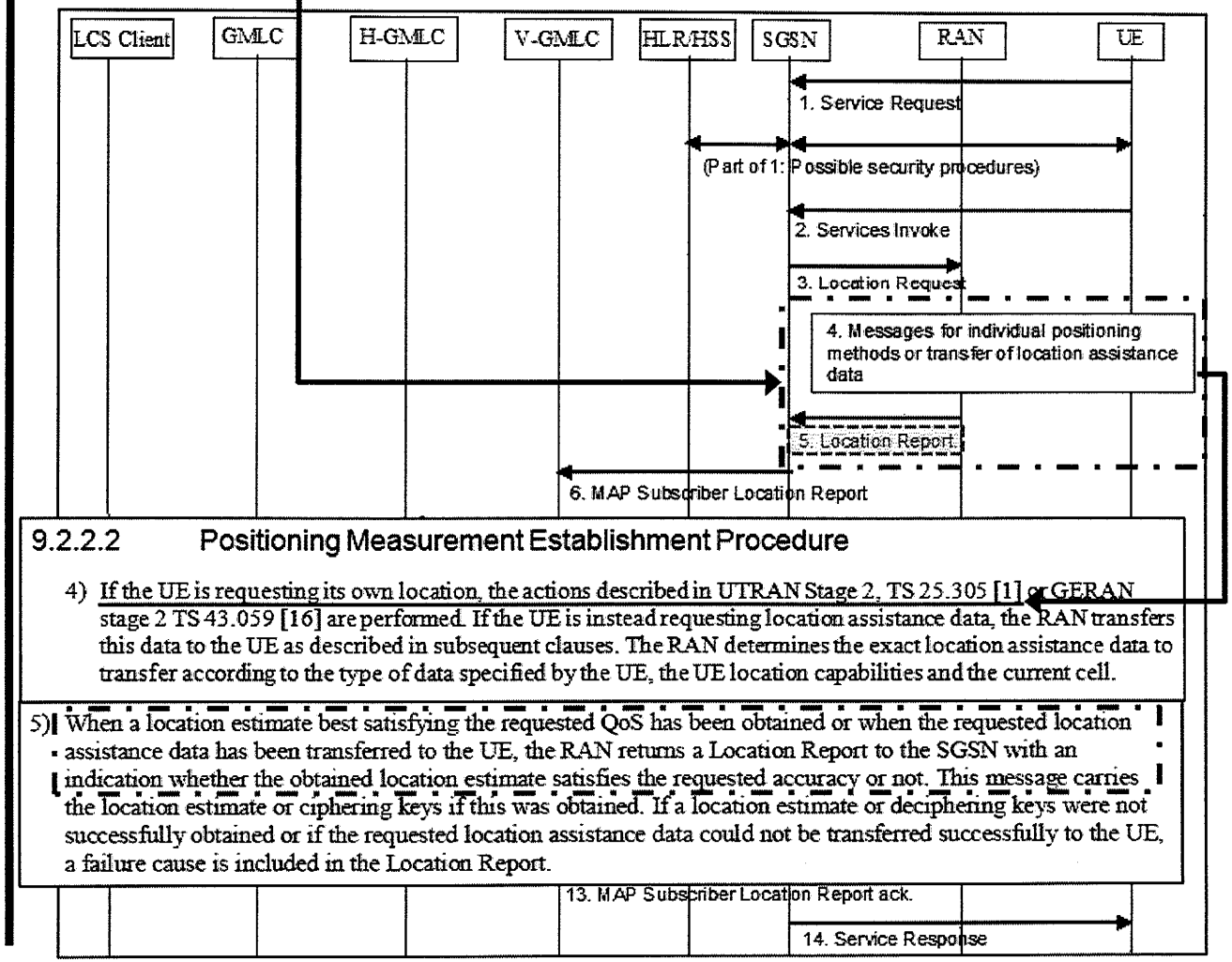
Source: http://www.google.com/mobile/android/maps/index.html

U.S. Patent No. 7,289,763 Claim 23 , 26, 28, 31 and 32 – Infringed by T-Mobile's Google Maps

acquiring positional data corresponding to an exact geographic location *for the mobile unit*

(Slide 2/3)

The positional data corresponding to an exact geographic location (EGL) for the mobile unit (UE) is acquired in steps 4 and 5 below. More specifically, the positional data corresponding to the EGL is contained in the Location Report, as will be shown in later slides.



9.2.2.2 Positioning Measurement Establishment Procedure

4) If the UE is requesting its own location, the actions described in UTRAN Stage 2, TS 25.305 [1] or GERAN stage 2 TS 43.059 [16] are performed. If the UE is instead requesting location assistance data, the RAN transfers this data to the UE as described in subsequent clauses. The RAN determines the exact location assistance data to transfer according to the type of data specified by the UE, the UE location capabilities and the current cell.

5) When a location estimate best satisfying the requested QoS has been obtained or when the requested location assistance data has been transferred to the UE, the RAN returns a Location Report to the SGSN with an indication whether the obtained location estimate satisfies the requested accuracy or not. This message carries the location estimate or ciphering keys if this was obtained. If a location estimate or deciphering keys were not successfully obtained or if the requested location assistance data could not be transferred successfully to the UE, a failure cause is included in the Location Report.

Source: 3GPP TS 23.271 V7.9.0 (2007-09), Pgs. 100, 101

U.S. Patent No. 7,289,763 Claim 23 , 26, 28, 31 and 32 – Infringed by T-Mobile's Google Maps

acquiring positional data corresponding to an exact geographic location for the mobile unit

(Slide 3/3)

The Location Report message defined in 3GPP TS 23.271 contains the exact geographic location.

7.1.2 Location Report

The access network reports the location of the Target UE to the core network entities. The location report may contain the following information as defined in the corresponding location request:

- the geographical co-ordinates of the Target UE;
- the positioning method used to obtain the location estimate if the access network is either GERAN in the A/Gb mode, GERAN in the Iu mode or UTRAN in the Iu mode.
- the service area in which the Target UE is located;
- achieved quality level of the location estimate;
- velocity estimate of the Target UE, if available;

Location Estimate: geographic location of an UE and/or a valid Mobile Equipment (ME), expressed in latitude and longitude data. The Location Estimate shall be represented in a well-defined universal format. Translation from this universal format to another geographic location system may be supported, although the details are considered outside the scope of the primitive services. The location estimate may include the velocity of the UE.

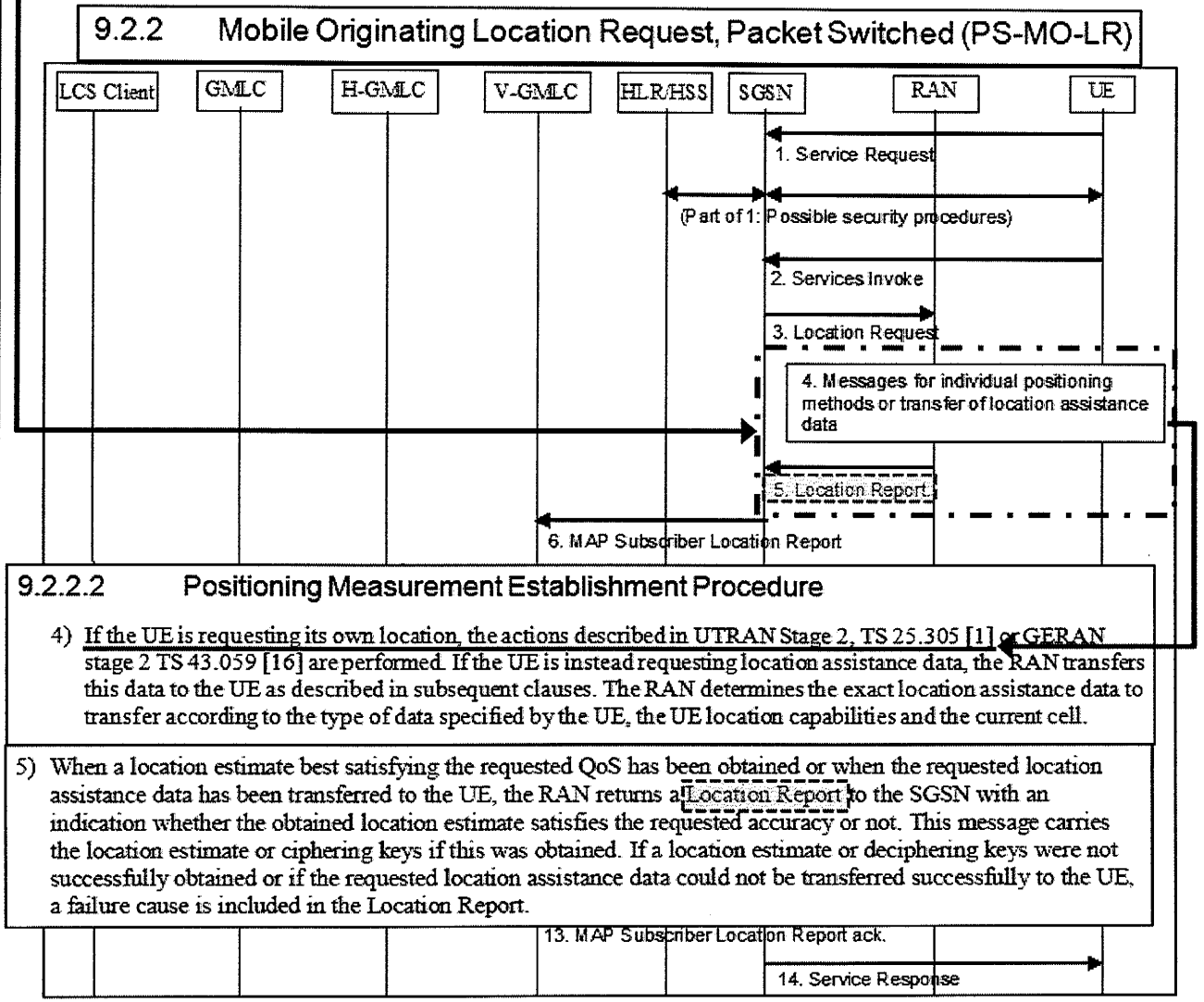
Source: 3GPP TS 23.271 V7.9.0 (2007-09), Pgs. 12 and 39

U.S. Patent No. 7,289,763 Claim 23 , 26, 28, 31 and 32 – Infringed by T-Mobile's Google Maps

via the cellular communication system;

(Slide 1/2)

As shown previously, the call flow below implements the Accused Service. In order to get the position information from the mobile unit to the Serving GPRS Support Node (SGSN) the data is sent through the cellular communication system (i.e. through the Radio Access Network (RAN))



Source: 3GPP TS 23.271 V7.9.0 (2007-09), Pgs. 100-101

U.S. Patent No. 7,289,763 Claim 23 , 26, 28, 31 and 32 – Infringed by T-Mobile's Google Maps

via the cellular communication system;

(Slide 2(i)/2)

More specifically, for the preceding call flow, "Messages for individual positioning methods ...." is a step governed by the 3GPP TS 25.305 standard. Under this standard, positional data corresponding to an EGL for the specific mobile unit can be acquired via the cellular communication system. Where "RNC based selection of OTDOA" applies, the following call flow specifies how this happens.

9.6.1 RNC based selection of OTDOA

1. The operation begins with an authenticated request for positioning information about a UE from an application in the CN being received at the SRNC. The request from the CN may be a request for on-demand or periodic reporting. The SRNC considers the request and the UTRAN and UE capabilities.
2. The SRNC requests from the UE the measurement of the OTDOA for the signals in the active and neighbourhood sets. These measurements are made while the UE is in connected mode CELL_DCH state. If the location request from the CN in step 1 contained periodic reporting information (reporting interval and amount of reports), the SRNC may at this step request periodic OTDOA measurement reporting from the UE according to subclause 6.6.4.1.
3. If it is considered advantageous to do so, the SRNC requests the UE Rx-Tx timing difference (FDD only) or UE timing advance, T_{ADV} (1.28 Mcps TDD) information from the UE. If the location request from the CN in step 1 contained periodic reporting information (reporting interval and amount of reports), the SRNC may at this step request periodic measurement reporting from the UE according to subclause 6.6.4.1.
4. The UE returns the OTDOA measures to the SRNC. The SRNC receives the OTDOA information and co-ordinates obtaining other information to support the calculation request.
5. The UE returns the UE Rx-Tx timing difference (FDD only) or UE timing advance, T_{ADV} (1.28 Mcps TDD) information to the SRNC, together with a time stamp of when the value was obtained.
6. If there are insufficient OTDOA measures, or it is otherwise considered advantageous to do so, the SRNC requests the RTT (in FDD) or Rx timing deviation (in TDD) and/or angle of arrival (in 1.28 Mcps TDD) measure for the UE from the serving Node B.
7. In FDD, the SRNC requests the RTD values for the associated transmitters from the associated database. These may be stored locally if they are constant over time, otherwise they must be updated to represent the RTD timing at the time-of-day the OTDOA measurements were made.
8. The Node B returns the RTT (in FDD) or Rx Timing Deviation (in TDD) and/or angle of arrival (in 1.28 Mcps TDD) measures to the SRNC if they were requested.
9. The SRNC performs a position, and optional velocity calculation using the OTDOA, RTD and, if necessary, RTT (in FDD) or Rx timing deviation and UE timing advance (in TDD) information and angle of arrival information (1.28 Mcps TDD). The calculation may include a co-ordinate transformation to the geographic system requested by the application. The position estimate includes the position and the estimated accuracy of the results. The optional velocity estimate may also include an estimated accuracy. In networks that include the SAS, the SAS may perform the position calculation and then pass the position estimate to the SRNC.

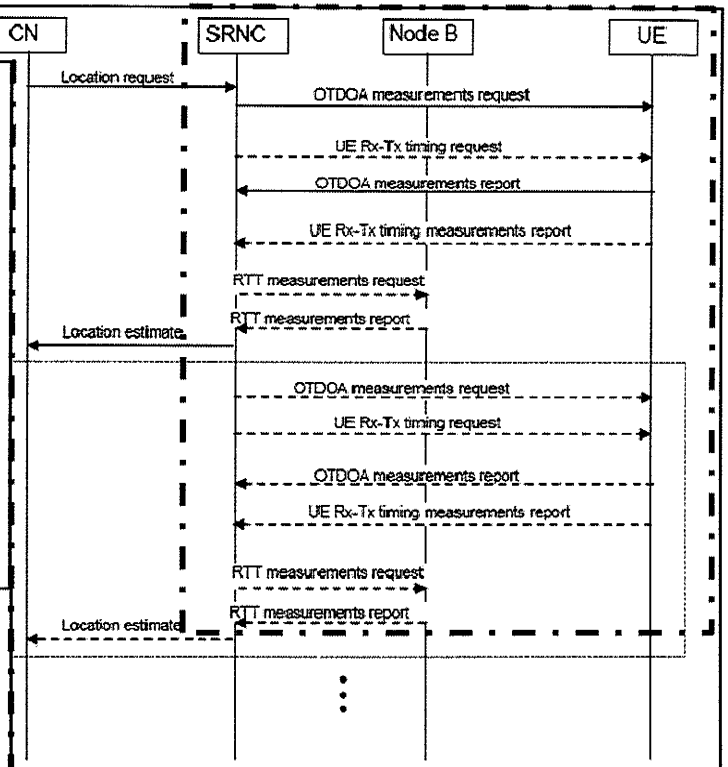


Figure 9.2: OTDOA Signalling Operations

Source: 3GPP TS 25.305, Pgs. 42-44

U.S. Patent No. 7,289,763 Claim 23, 26, 28, 31 and 32 – Infringed by T-Mobile's Google Maps

via the cellular communication system;

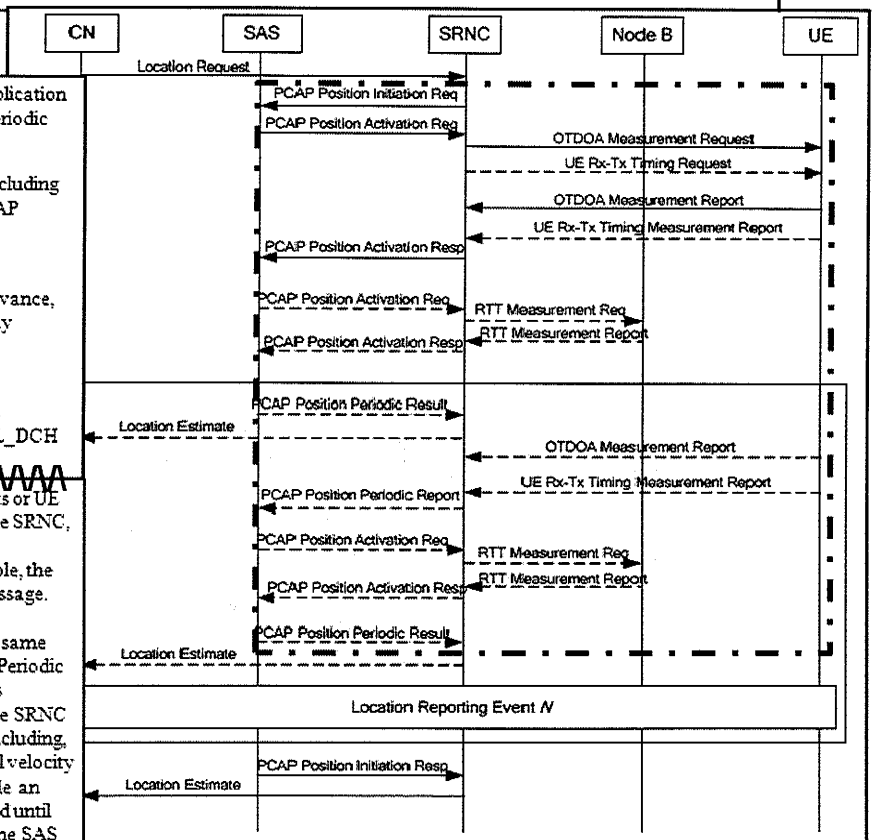
(Slide 2(ii)/2)

More specifically, for the preceding call flow, "Messages for individual positioning methods ...." is a step governed by the 3GPP TS 25.305 standard. Under this standard, positional data corresponding to an EGL for the specific mobile unit can be acquired via the cellular communication system. Where "SAS based selection of OTDOA" applies, the following call flow specifies how this happens.

9.6.2 SAS based selection of OTDOA

1. The operation begins with an authenticated request for positioning information about a UE from an application in the CN being received at the SRNC. The request from the CN may be a request for on-demand or periodic reporting. The SRNC considers the request and the UTRAN and UE capabilities.
2. The SRNC forwards the information contained in the RANAP Location Reporting Control message, including any periodic reporting information, plus the Cell ID and UE capability information to the SAS in a PCAP Position Initiation Request message.
3. The SAS sends a PCAP Position Activation Request message to the SRNC that requests the OTDOA positioning method and may also request the UE Rx-Tx timing difference (FDD only) or UE timing advance, T_{ADV} (1.28 Mcps TDD) information from the UE. The PCAP Position Activation Request message may include periodic reporting information (amount of reports and reporting interval).
4. The SRNC requests from the UE the measurement of the OTDOA for the signals in the active and neighbourhood sets. The OTDOA measurement request may include a request for periodic reporting as described in subclause 6.6.4.1. These measurements are made while the UE is in connected mode CELL_DCH state.

15. If periodic UE reporting was requested in step 4 or 5, the UE continues to send OTDOA measurements or UE Rx-Tx timing difference (FDD only) or UE timing advance, T_{ADV} (1.28 Mcps TDD) information to the SRNC, together with a time stamp of when the value was obtained, one reporting interval after the previous measurement report. The SRNC forwards the OTDOA measurement report information and, if available, the UE Rx-Tx timing measurement report information to the SAS in a PCAP Position Periodic Report message. The SRNC may aggregate the OTDOA measurement report information and the UE Rx-Tx timing measurement report information, if both are received from the UE in separate RRC messages, into the same PCAP Position Periodic Report message or may send this information in two separate PCAP Position Periodic Report messages. Steps 9 to 12 may be repeated for each new position estimate, and the SAS performs OTDOA based or Cell ID based position calculation and forwards each new position information to the SRNC in a PCAP Position Periodic Result message. The SRNC passes the new position estimate to the CN including, if available, the positioning method (or the list of the methods) used to obtain the position and optional velocity estimate. If the CN has requested accuracy for the position estimate, the Location response shall include an indication whether the position estimate satisfies the requested accuracy or not. This step 15 is repeated until the desired amount of reports has been attained or the procedure is cancelled by the CN or UTRAN. The SAS may send the final location estimate in a PCAP Position Initiation Response message to the SRNC, and the SRNC forwards the final location information to the CN.
16. If periodic UE reporting was not requested in step 4 or 5, but was requested in step 2, the SAS may repeat the steps 3 to 14 as for the first request until the desired amount of reports has been attained or the procedure is cancled by the CN or UTRAN. When repeating step 13 for the final request, the SAS returns the resulting final position estimate to the SRNC in a PCAP: Position Initiation Response message.



ure 9.3: OTDOA Signalling Operations for SAS based positioning method selection

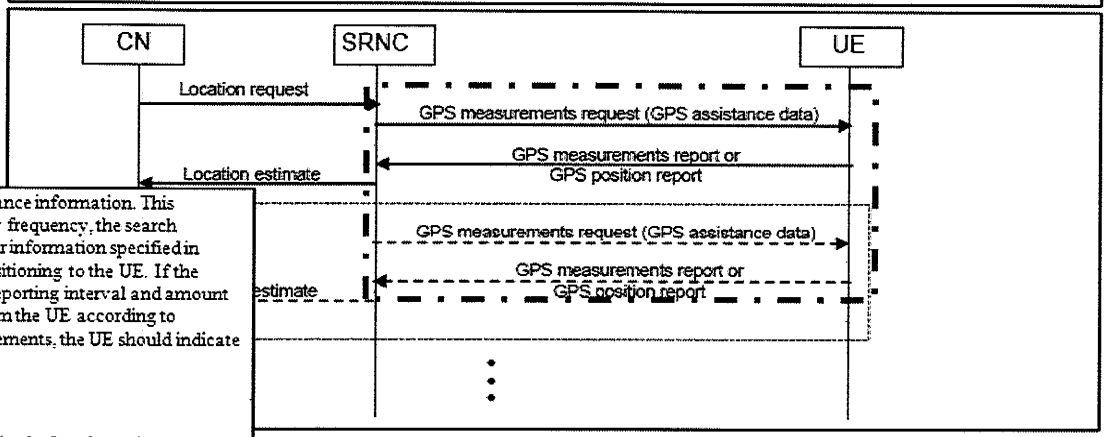
Source: 3GPP TS 25.305, Pgs. 44-46

via the cellular communication system;

(Slide 2(iii)/2)

More specifically, for the preceding call flow, "Messages for individual positioning methods ...." is a step governed by the 3GPP TS 25.305 standard. Under this standard, positional data corresponding to an EGL for the specific mobile unit can be acquired via the cellular communication system. Where "RNC based Network Assisted GPS Positioning" applies, the following call flow specifies how this happens.

10.6 RNC based Network Assisted GPS positioning Procedure



2. Depending on the UE capabilities, the network sends to the UE certain GPS assistance information. This information may include: the reference time for GPS, the satellite IDs, the Doppler frequency, the search window and its centre, the ephemeris and clock corrections, the almanac, and other information specified in 10.5.1. Depending on the UE capabilities, the network sends a request for GPS positioning to the UE. If the location request from the CN in step 1 contained periodic reporting information (reporting interval and amount of reports), the SRNC may at this step request periodic measurement reporting from the UE according to subclause 6.6.4.1. If the UE has not enough assistance data to perform the measurements, the UE should indicate it to the SRNC and additionally request for assistance data.

   For UE-based method, jump to step 5.

3. For UE-assisted method, the SRNC may optionally request the following information before the assistance message(s) is (are) sent to the UE: the LMU update (see NOTE), the RTT measurements (from the Node Bs in the active set) to compensate for the one-way propagation delays. The LMU (associated or stand-alone) returns the information containing the time difference between the Node B and the GPS (e.g. UTRAN GPS timing of cell frames or SFN-SFN Observed Time Difference) to the CRNC. The Node B returns its RTT measurement to the CRNC. If the CRNC is not the SRNC, the CRNC forwards these information to SRNC.

4. The network requests from the UE the measurement of GPS satellite pseudoranges and other information specified in 10.5.1. These measurements may be made while the UE is in RRC connected mode CELL_DCH state. The SRNC may request SFN-SFN Observed Time Difference measurements and Rx-Tx [illegible] information from the UE to support the processing related to the RTT measurements.

5. The UE returns to the network the measurement of GPS satellite pseudoranges and other information specified in 10.5.1. If requested, the UE returns to the SRNC SFN-SFN measurements and the Rx-Tx time difference information, together with a time stamp of when these values were obtained.

6 The UE position and optional velocity is calculated in the network.

7. If there is insufficient information to yield a UE positioning estimate, the SRNC may start a new process from step 3.

8. In case of UE based method, UE returns the position and optional velocity estimate to the SRNC. This estimate includes the position and optionally, velocity, the estimated accuracy of the results and the time of the estimate.

9. In networks that include the SAS, the SAS passes the position estimate to the SRNC.

Source: 3GPP TS 25.305, Pgs. 53-54

U.S. Patent No. 7,289,763 Claim 23 , 26, 28, 31 and 32 – Infringed by T-Mobile's Google Maps

via the cellular communication system;

(Slide 2(iv)/2)

More specifically, for the preceding call flow, "Messages for individual positioning methods ...." is a step governed by the 3GPP TS 25.305 standard. Under this standard, positional data corresponding to an EGL for the specific mobile unit can be acquired via the cellular communication system. Where "SAS initiated Network Assisted GPS Positioning" applies, the following call flow specifies how this happens.

10.7 SAS initiated Network Assisted GPS positioning Procedure

The following describes the signalling for the optional initiation of the network assisted GPS positioning procedure by the SAS.

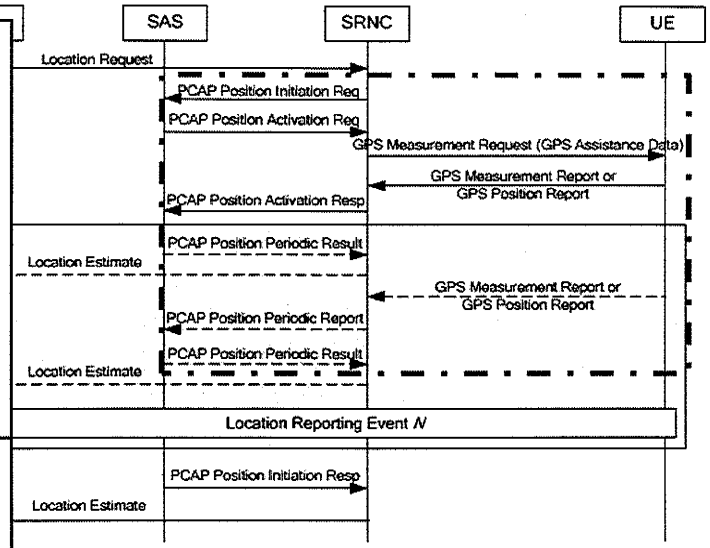


Figure 10.4: Network-assisted GPS methods when initiated by the SAS

2. The SRNC sends parameters received in the location request, including any periodic reporting information, together with the Cell ID and UE capability information to the SAS in a PCAP: Position Initiation Request message via the Iupc interface.

3. Depending on the UE capabilities, the SAS initiates an A-GPS positioning procedure by sending a PCAP: Position Activation Request message containing A-GPS assistance data to the SRNC via the Iupc interface. The PCAP Position Activation Request message may include periodic reporting information (number of reports and reporting interval). The SAS may provide all or some A-GPS assistance data needed by the UE. This may include timing assistance data that the SAS may have obtained from associated LMUs or from another source (e.g. GPS Reference Network or measurements from UEs previously positioned by the SAS using A-GPS).

4. The SRNC forwards to the UE the A-GPS positioning request received from the SAS using RRC signalling. The SRNC also forwards in the RRC signalling message(s) the SAS request for either A-GPS measurements, in the case of UE assisted A-GPS, or an A-GPS position and optional velocity estimate, in the case of UE based A-GPS. The RRC signalling may include a request for periodic reporting as described in subclause 6.6.4.1 if this was received in step 3. For a description of UE based A-GPS, jump to step 9.

14. If periodic UE reporting was not requested in step 4, but was requested in step 2, the SAS may repeat the steps 3 to 12 as for the first request until the desired amount of reports has been attained or the procedure is cancelled by the CN or UTRAN. When repeating step 10 for the final request, the SAS returns the resulting final position estimate to the SRNC in a PCAP: Position Initiation Response message.

NOTE: An update to the SAS from an associated LMU, of the time difference between GPS and the Node B, may be performed on a per-request basis (with respect to each UE Positioning request) or be performed in a timely manner that is independent of individual UE Positioning requests. The latter is preferable when there is a large volume of UE Positioning requests.

U.S. Patent No. 7,289,763 Claim 23 , 26, 28, 31 and 32 – Infringed by T-Mobile's Google Maps

Source: 3GPP TS 25.305, Pgs. 54-56

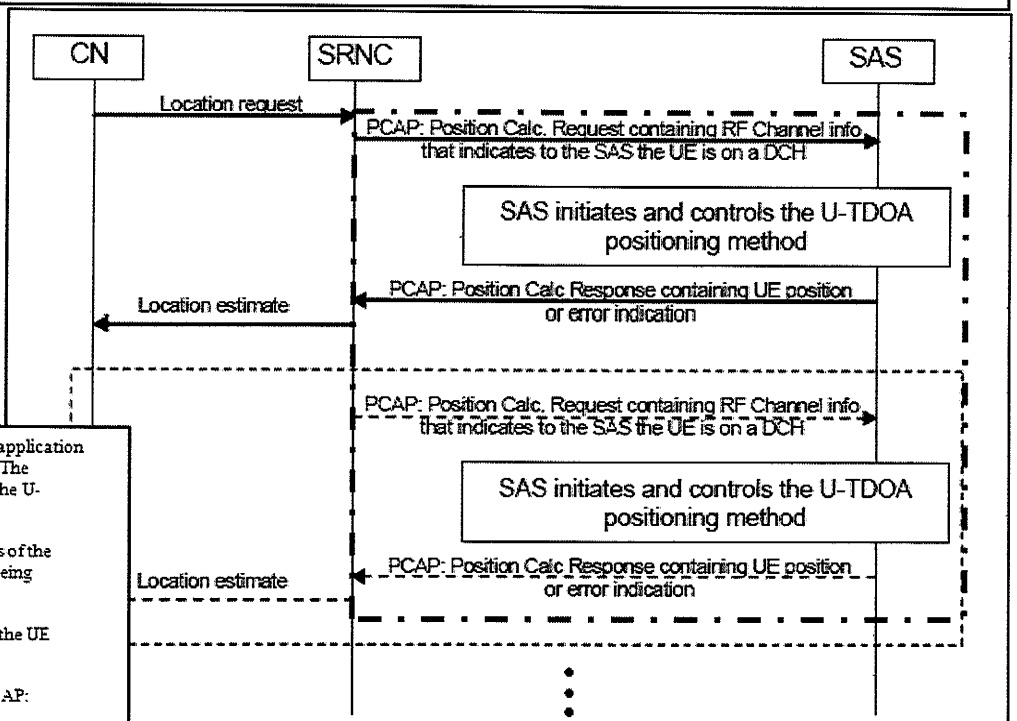
via the cellular communication system;

(Slide 2(v)/2)

More specifically, for the preceding call flow, "Messages for individual positioning methods ...." is a step governed by the 3GPP TS 25.305 standard. Under this standard, positional data corresponding to an EGL for the specific mobile unit can be acquired via the cellular communication system. Where "RNC based U-TDOA Positioning for Cell_DCH RRC State" applies, the following call flow specifies how this happens.

12.3 RNC based U-TDOA positioning for Cell_DCH and Cell_FACH RRC states

12.3.1 UE in CELL_DCH state



1. The operation begins with an authenticated request for positioning information about a UE from an application in the core network being received at the SRNC in a RANAP: Location Reporting Control message. The request from the CN may be a request for on-demand or periodic reporting. The SRNC may invoke the U-TDOA positioning method via the Iupc interface.
2. The SRNC sends a PCAP: Position Calculation Request message to the SAS containing the contents of the RANAP Location Reporting Control message, the RF channel information and Cell ID for the UE being positioned. This information indicates that the UE is in the CELL_DCH state.
3. The SAS configures the U-TDOA capable LMUs, analyzes the returned information and calculates the UE position and optionally, velocity.
4. The SAS returns the UE position and optionally the velocity or error indication to the SRNC in a PCAP: Position Calculation Response message.
5. The SRNC returns the UE position and optionally the velocity, to the CN in a RANAP: Location Report message.
6. If periodic reporting was requested by the CN at step 1, steps 2 to 5 may be repeated until the desired amount if reports has been attained, or the procedure is cancelled by UTRAN or CN.

ure 12.7: RNC initiated U-TDOA positioning procedure in CELL_DCH state

Source: 3GPP TS 25.305, Pgs. 59-60

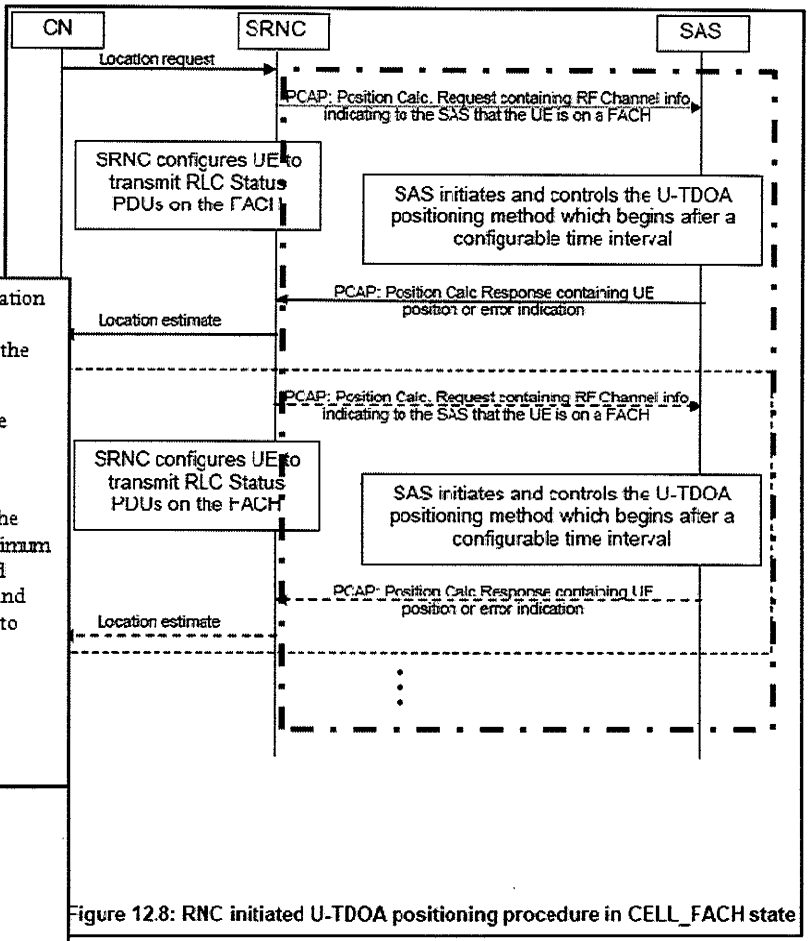
via the cellular communication system;

(Slide 2(vi)/2)

More specifically, for the preceding call flow, "Messages for individual positioning methods ...." is a step governed by the 3GPP TS 25.305 standard. Under this standard, positional data corresponding to an EGL for the specific mobile unit can be acquired via the cellular communication system. Where "RNC based U-TDOA Positioning for Cell_FACH RRC State" applies, the following call flow specifies how this happens.

12.3 RNC based U-TDOA positioning for Cell_DCH and Cell_FACH RRC states

12.3.2 UE in CELL_FACH state



1. The operation begins with an authenticated request for positioning information about a UE from an application in the core network being received at the SRNC in a RANAP: Location Reporting Conrol message. The request from the CN may be a request for either on-demand or periodic reporting. The SRNC may invoke the U-TDOA positioning method via the Iupc interface.
2. The SRNC sends a PCAP: Position Calculation Request message to the SAS containing the contents of the RANAP Location Reporting Control message, the RF channel information and Cell ID for the UE being positioned. This information indicates that the UE is on a FACH.
3. After sending the Position Calculation Request message the SRNC shall execute a procedure that causes the UE being positioned to transmit a certain minimum number of pre-coded bits within a recommended maximum time interval of three seconds. The number of bits and actual time interval should be related to the required location accuracy, the propagation conditions in the serving cell and the LMU configuration for the SAS and may be determined in an implementation dependent manner. As an example of a method to cause the UE to transmit, the SRNC may configure the UE to transmit RLC Status PDUs as described in subclause 12.4.2 below.
4. After a configurable time interval the SAS configures the U-TDOA capable LMUs, analyzes the returned information and calculates the UE position and optionally, velocity.
5. The SAS returns the UE position and optionally, velocity to the SRNC in a PCAP: Position Calculation Response message.
6. The SRNC returns the UE position and optionally, the velocity to the CN in a RANAP: Location Report message.
7. If periodic reporting was requested by the CN at step 1, steps 2 to 6 may be repeated until the desired amount if reports has been attained, or the procedure is cancelled by UTRAN or CN.

Figure 12.8: RNC initiated U-TDOA positioning procedure in CELL_FACH state

Source: 3GPP TS 25.305, Pgs. 60-62

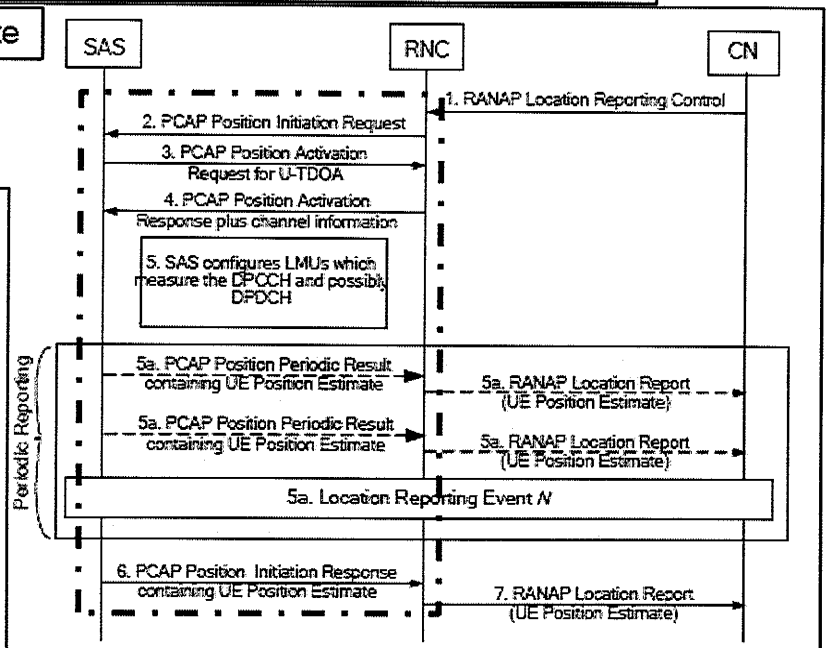
via the cellular communication system;

(Slide 2(vii)/2)

More specifically, for the preceding call flow, "Messages for individual positioning methods ...." is a step governed by the 3GPP TS 25.305 standard. Under this standard, positional data corresponding to an EGL for the specific mobile unit can be acquired via the cellular communication system. Where "SAS Initiated U-TDOA Positioning for Cell_DCH RRC State" applies, the following call flow specifies how this happens.

12.4 Optional SAS initiated U-TDOA positioning for Cell_DCH and Cell_FACH RRC states

12.4.1 UE in CELL_DCH state



1) The procedure starts when a RANAP: Location Reporting Control message requesting a geographical UE position is received at the SRNC. The RANAP Location Reporting Control message may contain periodic location information (amount of reports and reporting interval).

2) Location Reporting Control message parameters, including any periodic location information, plus UE capability information plus Cell ID are forwarded to the SAS in the PCAP: Position Initiation Request message.

3) Based upon the service type (emergency service, etc), and the requested QoS, the SAS initiates a U-TDOA position, and sends a PCAP: Position Activation Request message indicating U-TDOA to the SRNC. The SRNC chooses to bring the UE to the CELL_DCH state if not already in this state.

4) The SRNC returns U-TDOA channel information in a PCAP: Position Activation Response message to the SAS.

5) The SAS configures the U-TDOA capable LMUs to perform measurements. The U-TDOA capable LMUs measure the [FDD: DPCCH and possibly DPDCH] [TDD: DPCH].

5a) If periodic reporting was requested in step 2, the SAS obtains a position, and optionally a velocity estimate using the U-TDOA capable LMU measurements and returns it to the SRNC in a PCAP: Position Periodic Result message. The SAS continues to send PCAP: Position Periodic Result messages to the SRNC until the requested amount of reports has been attained or the procedure is cancelled by UTRAN or CN. The SAS sends the final location information to the SRNC in a PCAP Position Initiation Response message. The SAS may repeat steps 3 and 4 at any time to obtain or verify the U-TDOA channel information. The SRNC returns the individual position estimates and optionally the velocity estimate to the CN in a RANAP: Location Report message.

6) If periodic reporting was not requested in step 2, the SAS obtains a position, and optionally a velocity estimate using the U-TDOA capable LMU measurements and returns it to the SRNC in a PCAP: Position Initiation Response message.

7) The SRNC returns the position estimate and optionally the velocity estimate to the CN in a RANAP: Location Report message.

Figure 12.9 U-TDOA message flow, UE in the CELL_DCH state

Source: 3GPP TS 25.305, Pgs. 62-63

via the cellular communication system;

(Slide 2(viii)/2)

More specifically, for the preceding call flow, "Messages for individual positioning methods ...." is a step governed by the 3GPP TS 25.305 standard. Under this standard, positional data corresponding to an EGL for the specific mobile unit can be acquired via the cellular communication system. Where "SAS Initiated U-TDOA Positioning for Cell_FACH RRC State" applies, the following call flow specifies how this happens.

12.4 Optional SAS initiated U-TDOA positioning for Cell_DCH and Cell_FACH RRC states

12.4.2. UE in CELL_FACH state

1) The procedure starts when a RANAP: Location Reporting Control message requesting a geographical UE position is received at the SRNC. The RANAP Location Reporting Control message may contain periodic location information (amount of reports and reporting interval).

2) Location Reporting Control message parameters, including any periodic location information, plus Cell ID plus UE capability information are forwarded to the SAS in the PCAP: Position Initiation Request message.

3) Based upon the service type (emergency service, etc), and the requested QOS, the SAS initiates a U-TDOA position, and sends a PCAP: Position Activation Request message indicating U-TDOA to the SRNC. The SRNC chooses to bring the UE to the CELL_FACH state if initially in the CELL_PCH or URA_PCH state.

4) The SRNC returns U-TDOA channel information in a PCAP: Position Activation Response message to the SAS.

5) The SAS configures the U-TDOA capable LMUs to perform measurements. The U-TDOA capable LMUs measure the PRACH or PCPCH bursts associated with the UE being positioned.

6) The SRNC, after sending the PCAP Position Activation Response message, shall execute a procedure that causes the UE being positioned to transmit a certain number of pre-coded bits within a certain period of time. The number of pre-coded bits and period of time should be based upon (e.g. set equal to) a recommended number of bits and recommended time interval defined by the SAS in the PCAP Position Activation Request message invoking U-TDOA positioning. As an example, the SRNC could reconfigure the radio bearer so that the UE begins to send RLC status PDUs every 100 mS by sending the UE a Radio_Bearer_Reconfiguration message with the TimerStatusPeriodic IE configured for 100 milliseconds.

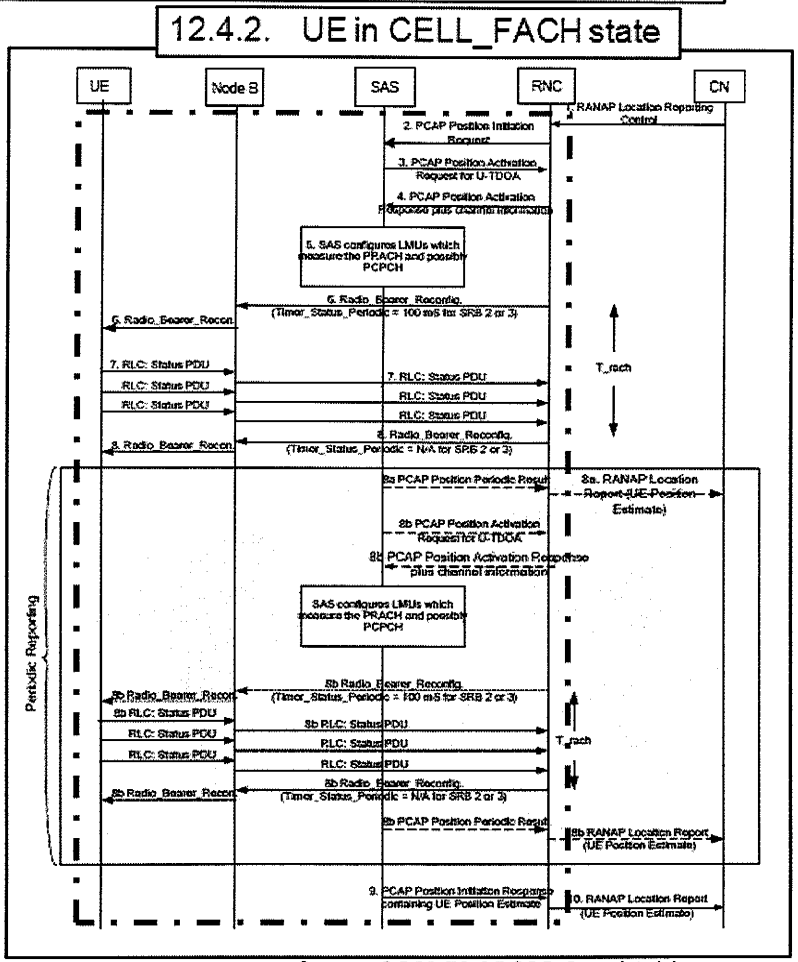
7) The UE begins to send RLC status PDUs every 100 milliseconds.

8) After expiration of the configurable T_rach timer the SRNC sends the UE a Radio_Bearer_Reconfiguration message with the TimerStatusPeriodic IE set to NA in order to stop the periodic status reporting.

8a) If periodic reporting was requested in step 2, the SAS obtains a position, and optionally a velocity estimate using the U-TDOA capable LMU measurements and returns it to the SRNC in a PCAP: Position Periodic Result message. The SRNC returns the position estimate and optionally the velocity estimate to the CN in a RANAP: Location Report message. When the periodic reporting interval transpired, the SAS may send a new PCAP: Position Activation Request message to the SRNC and steps 3 to 8 may be repeated until the requested amount of reports has been attained or the procedure is cancelled by UTRAN or CN. The SAS sends the final location information to the SRNC in a PCAP Position Initiation Response message. The SRNC returns the individual position estimates and optionally the velocity estimate to the CN in a RANAP: Location Report message.

9) If periodic reporting was not requested in step 2, the SAS obtains a position, and optionally a velocity estimate using the U-TDOA capable LMU measurements and returns it to the SRNC in a PCAP: Position Initiation Response message.

10) The SRNC returns the position estimate and optionally a velocity estimate to the CN in a RANAP: Location Report message.



Source: 3GPP TS 25.305, Pgs. 64-66

comparing the positional data with stored geographic data for the location-based service; and

Comparing the mobile phone's positional data with a stored geographic data occurs whenever the system provides "turn-by-turn directions".

Features

My Location (beta). Google Maps on Android uses the built-in GPS to show your location on the map. And if GPS reading is temporarily unavailable, My Location shows your approximate location on the map. So you can always find where you are.

Watch a video to learn more about how My Location works.

Map and satellite views. Google Maps on Android gives you both map and satellite views of the area you're looking at, using an interface that feels just like it does on the desktop. Scroll in a direction to see more of the map, or zoom in and out by tapping the magnifying glass.

Street View. Want to see what would it look like if you were right there? Street View brings you street-level imagery of the location you're looking for, so you can explore an area thousands of miles away. With Compass Mode you can literally turn around and check for yourself.

Business listings. Search for businesses by name (e.g. "Joe's Pasta"), or by type (e.g. "Italian food") – then dial the business you're interested in with a single click. Thanks to My Location, it's easy to find nearby businesses without even having to enter your current location.

Driving directions. It's easy to get turn-by-turn driving directions. Thanks to the My Location feature, you don't even have to enter your starting point.

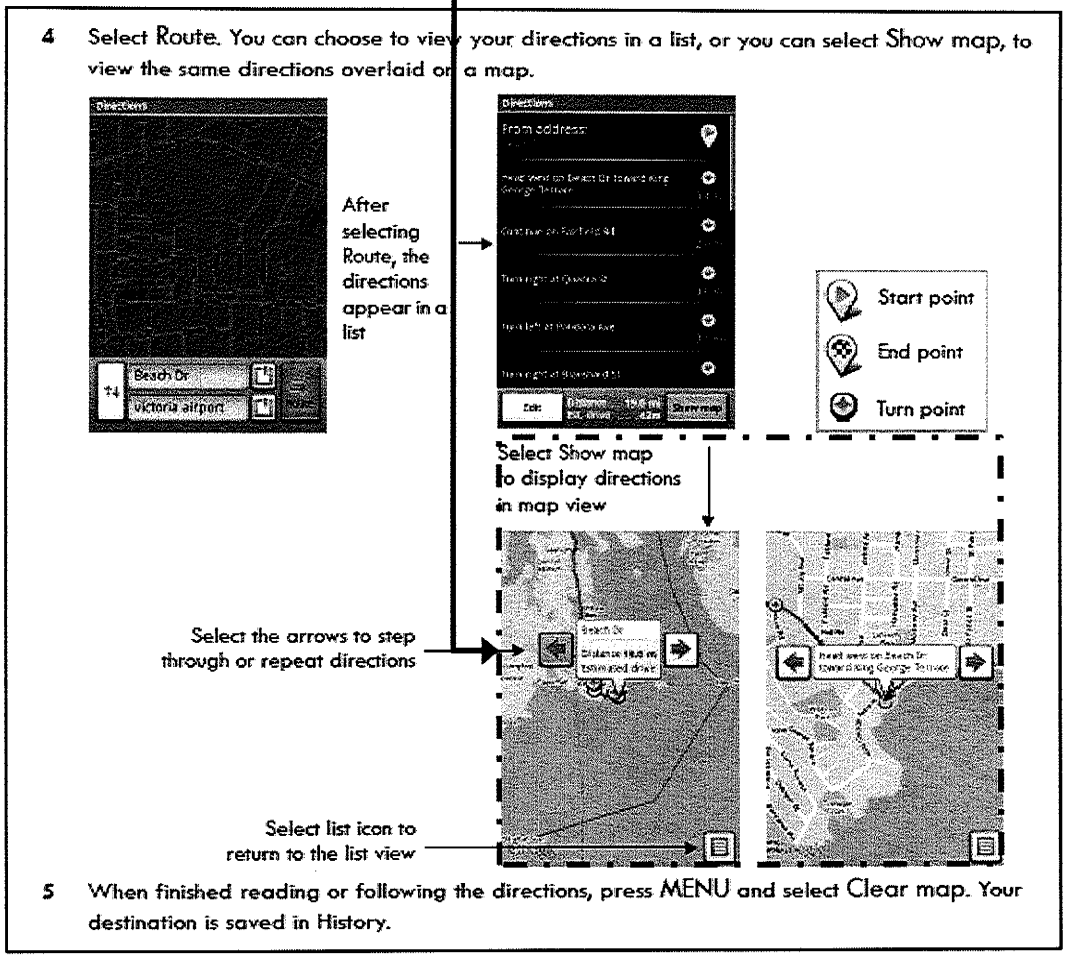
Traffic. Highways on Google Maps are colored green, yellow or red, based on real-time traffic data.

Source: http://www.google.com/mobile/android/maps/index.html

U.S. Patent No. 7,289,763 Claim 23 , 26, 28, 31 and 32 – Infringed by T-Mobile's Google Maps

responding to the request for a location-based service based on the comparison.

The response to the request for the location-based service based on the comparison is evident below.



Source: T-Mobile G1 User Guide, Page 75

U.S. Patent No. 7,289,763 Claim 23 , 26, 28, 31 and 32 – Infringed by T-Mobile's Google Maps

26. The method of claim 23, wherein the step of responding to the request comprises *furnishing the positional data.*

(Slide 1/2)

Positional data is furnished in responding to the request for a location-based service, i.e., navigation, which allows the user's location to be displayed on the cell phone.

Get directions

To get detailed directions to a location, do the following:

1 From the main Map screen, press MENU and select Directions.

2 Enter the starting point in the first box. You can type an address, or select to open the location source menu. Select from:

- My current location - Remember to have a location selected. (Read how in "Find your location" on page 72.)
- Contacts - Opens a list of the contacts you've stored with a physical address.
- History - Opens a menu of places you've visited.

3 Enter your destination in the second box. You can type an address or select to select from the location source menu.

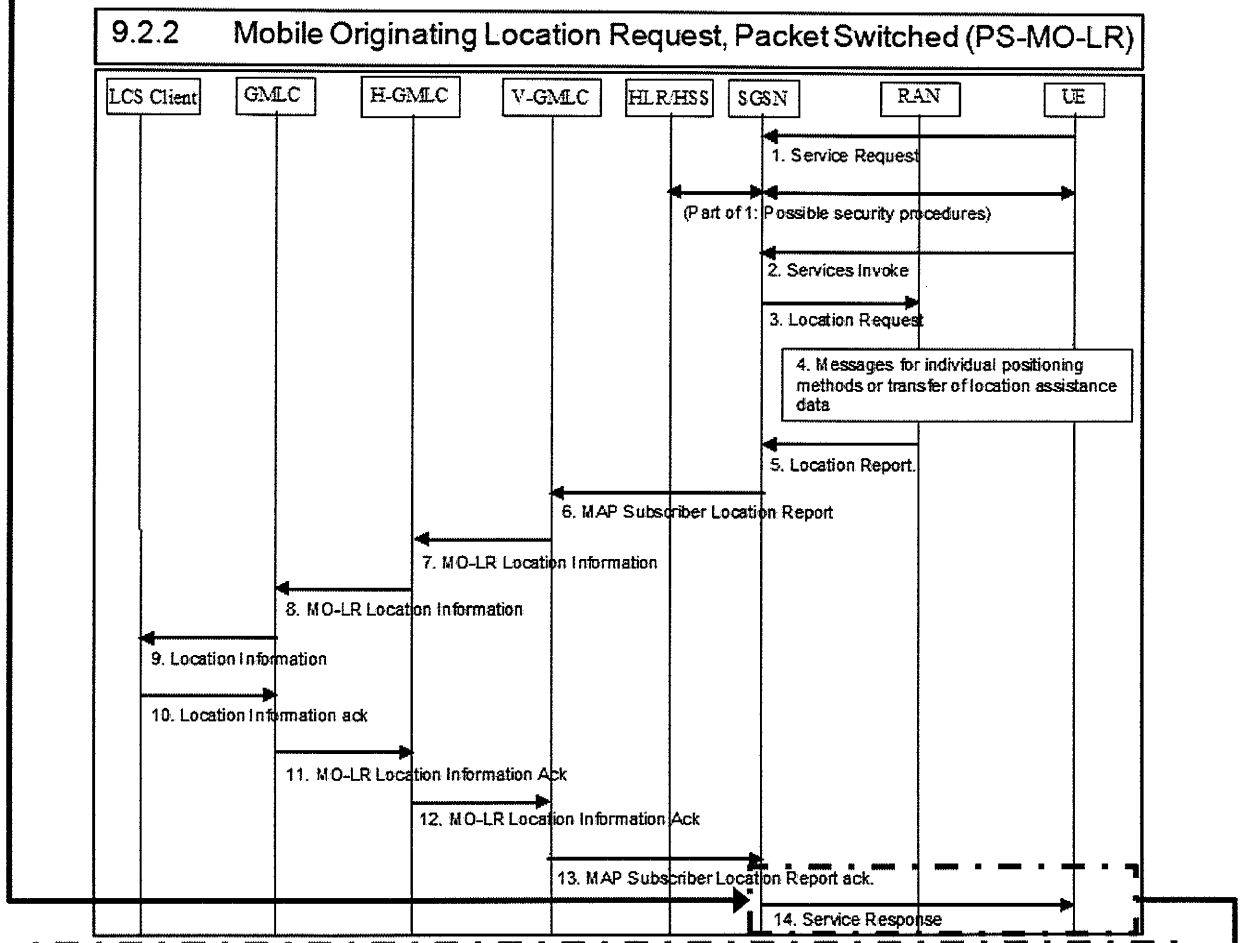
Source: T-Mobile G1 User Guide, Page 74

U.S. Patent No. 7,289,763 Claim 23 , 26, 28, 31 and 32 – Infringed by T-Mobile's Google Maps

26. The method of claim 23, wherein the step of responding to the request comprises *furnishing the positional data.*

(Slide 2/2)

Positional data is furnished in responding to the request for a location-based service, i.e., navigation, which allows the user's location to be displayed on the cell phone.



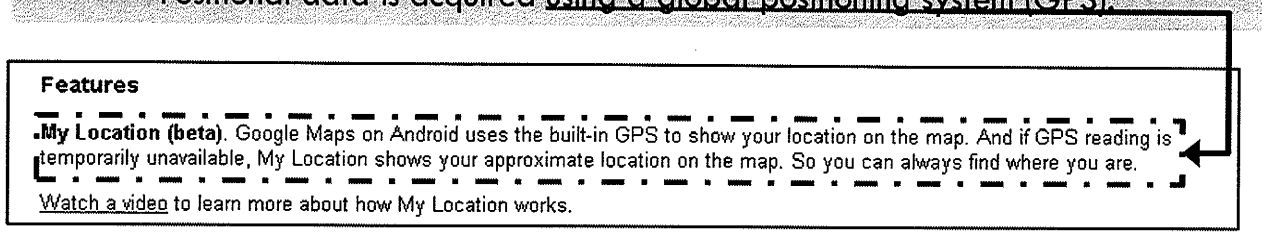
14)The SGSN returns a Service Response message to the UE carrying any location estimate requested by the UE including the indication received from RAN whether the obtained location estimate satisfies the requested accuracy or not, ciphering keys or an indicator whether a location estimate was successfully transferred to the identified LCS client. If the location estimate was successfully transferred to the identified LCS Client, the Service Response message shall specify whether the location estimate of the UE has been handled successfully by the identified LCS Client, and if not, the corresponding error cause obtained in step 13. The SGSN may record charging information.

Source: 3GPP TS 23.271 V7.9.0 (2007-09), Pgs. 100-101

U.S. Patent No. 7,289,763 Claim 23 , 26, 28, 31 and 32 – Infringed by T-Mobile's Google Maps

28. The method of claim 23, wherein *the positional data is acquired using a global positioning system.*

Positional data is acquired using a global positioning system (GPS).

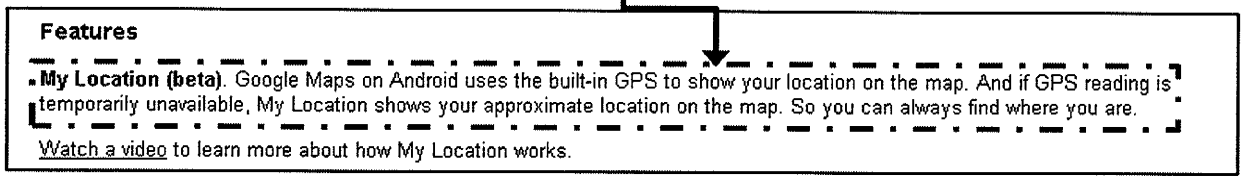


Source: http://www.google.com/mobile/android/maps/index.html

U.S. Patent No. 7,289,763 Claim 23 , 26, 28, 31 and 32 –
Infringed by T-Mobile's Google Maps

31. The method of claim 23, wherein *the positional data is acquired using a system selected from the group consisting of a global positioning system and triangulation.*

Positional data is acquired using global positioning system (GPS), which is one of the members of the group claimed.



Source: http://www.google.com/mobile/android/maps/index.html

U.S. Patent No. 7,289,763 Claim 23 , 26, 28, 31 and 32 – Infringed by T-Mobile's Google Maps

32. The method of claim 23, further comprising the step of *furnishing the positional data for use in the location-based service.*

(Slide 1/2)

Positional data is furnished for use in the location-based service, i.e., navigation, which allows the user's location to be displayed on the cell phone.

Get directions

To get detailed directions to a location, do the following:

1 From the main Map screen, press MENU and select Directions.

2 Enter the starting point in the first box. You can type an address, or select to open the location source menu. Select from:

- My current location - Remember to have a location selected. (Read how in "Find your location" on page 72.)
- Contacts - Opens a list of the contacts you've stored with a physical address.
- History - Opens a menu of places you've visited.

3 Enter your destination in the second box. You can type an address or select to select from the location source menu.

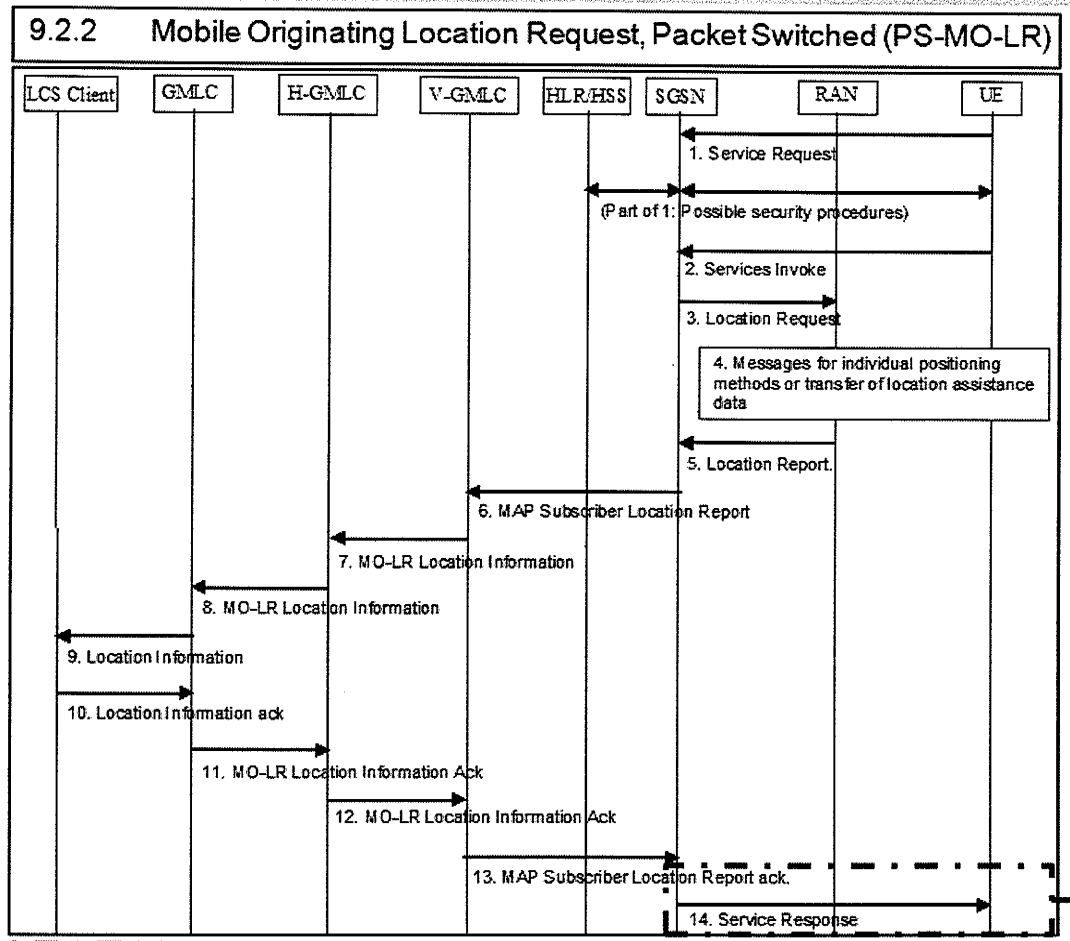
Source: T-Mobile G1 User Guide, Page 74

U.S. Patent No. 7,289,763 Claim 23 , 26, 28, 31 and 32 – Infringed by T-Mobile's Google Maps

32. The method of claim 23, further comprising the step of *furnishing the positional data for use in the location-based service.*

(Slide 2/2)

Positional data is furnished for use in the location-based service, i.e., navigation, which allows the user's location to be displayed on the cell phone.



14)The SGSN returns a Service Response message to the UE carrying any location estimate requested by the UE including the indication received from RAN whether the obtained location estimate satisfies the requested accuracy or not, ciphering keys or an indicator whether a location estimate was successfully transferred to the identified LCS client. If the location estimate was successfully transferred to the identified LCS Client, the Service Response message shall specify whether the location estimate of the UE has been handled successfully by the identified LCS Client, and if not, the corresponding error cause obtained in step 13. The SGSN may record charging information.

Source: 3GPP TS 23.271 V7.9.0 (2007-09), Pgs. 100-101

U.S. Patent No. 7,289,763 Claim 23 , 26, 28, 31 and 32 – Infringed by T-Mobile's Google Maps